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**REMARKS**

In this amendment, claim 1 is amended and claims 4-9 are added. Now pending in the application are claims 1-2 and 4-9. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

**Claim Amendments**

Claim 1 is amended to clarify the scope of the claimed invention. In particular, Applicant amends claim 1 to recite that the volume of the chamber is reduced to about zero before feeding the material into the chamber. Claim 4 is added to depend from claim 1 and recite that the volume of the chamber is reduced to an extent that contact with ambient air is precluded. Support for the claim amendments could be found in Fig. 1 and corresponding description at page 3, lines 22-28. No new matter is introduced.

**Claim Rejections Under 35 U.S.C. § 112**

Claims 1-2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner asserts that the meaning of last two lines of claim 1 is not clear. Specifically, the Examiner asserts that it is not clear what the "sprue point" is. In response to the rejection, Applicant respectfully refers the Examiner to Applicant's response filed October 27, 2003. The first full paragraph of page 4 of that response notes that page 4 of the specification beginning at line 6 discusses the sprue point. The specification provides as follows:

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In this case, the sprue point into the casting can be displaced such that advantageously there is no "sprue" in the conventional sense, i.e., a part which must be removed from the casting and can be used only as recycled material.

Furthermore, Merriam Webster's Collegiate Dictionary, 10<sup>th</sup> Edition (1997), defines sprue as 1: the hole through which metal or plastic is poured into the gate and thence into a mold, or 2: the waste piece cast in a sprue. Applicant submits that one of skill in the art will understand the sprue point to be, for example, the location at which metal or plastic is poured into the mold. Therefore, displacement of the sprue point relative to the metal or plastic in the mold as recited in claim 1 can avoid sprue, i.e. a part which must be removed from the casting and can be used only as recycled material. This is explained in more detail below.

#### Claim Rejections Under 35 U.S.C. § 102

Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Lester. Applicant respectfully traverses this rejection in light of the following reasons.

With reference to the specification, Applicant notes that the specification at page 3, lines 22-28, indicates that the volume of chamber 5, "can be kept to an extreme minimum by moving the two pistons 7 and 8 very close together. There is assurance at all times that even oxidation-prone material can be readily processed since any contact with ambient air is essentially precluded. The material is conveyed by conveying unit 4 into chamber 5, while sealing piston 8 is increasingly moved away from injection piston 7 to adjust for the quantity of admitted material, as Figure 2 shows."

At page 3, line 35, the specification continues:

Once the desired quantity of material has been admitted to chamber 5, the two pistons 7 and 8 move together. As is evident in Figure 3, the result is that chamber 5 is now closed relative to conveying unit 4.

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Sealing piston 8 is moved out of tube 6 and into mold 2. This action opens tube 6 and thus, chamber 5. A further movement of injection piston 7 causes the material to be injected from chamber 5 into mold 2.

For purposes of illustration, Appendix A, included herewith, includes two pages of figures and textual description of an illustrative example of the invention.

Applicant notes that the first figure of the Appendix illustrates the volume of the chamber is reduced to about zero before feeding the material into the chamber. The volume of the chamber may increase as the material is fed into the chamber (See, the second figure). The third figure depicts the final step of feeding the material into the chamber. The material in the chamber is moved to the mold (See, the fourth figure) and injected into the mold (See, the fifth figure). The attached figures are provided for only illustrative purposes and do not limit the scope of the claimed invention.

Applicant submits that Lester fails to disclose that the volume of the chamber is reduced to about zero before feeding the material into the chamber, as recited in claim 1. Lester discloses that the material flows into an open melting cavity (20). Lester also discloses that the melting cavity (20) has a big empty volume before feeding the material into the melting cavity. With the structure disclosed in Lester, the material is spread over the melting cavity (20) as the material is fed into the melting cavity (20). The material in the melting cavity (20) can be partially cool down before the material is injected into the mold. This cooling down builds up an "oxide skin" on the surface of the material that may cause faults in the structure of the final castings. In contrast, claim 1 recites that the volume of the chamber is reduced to about zero before feeding the material into the chamber, which prevents the oxidation of the material in the chamber by removing the contact of the material with air in the chamber. In light of the aforementioned arguments, Applicant submits that Lester fails to disclose each and every element of claim 1. Claim 2 depends from claim 1. Applicant therefore submits that claims 1-2 are in condition for allowance.

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Claims 1-2 are also rejected under 35 U.S.C. 102(b) as being anticipated by Chadwick. Applicant respectfully traverses this rejection in light of the following reasons.

Applicant submits that Chadwick fails to disclose that the volume of the chamber is reduced to about zero before feeding the material into the chamber, as recited in claim 1. Chadwick discloses in Fig. 2 that the injection chamber (5) has its maximum volume before feeding the material into the chamber. (See, column 4, lines 22-28). Chadwick discloses that when the pillar (6) seals the central region (3a) and the piston (4) is fully retracted, the chamber (5) is charged with the material. Chadwick does not disclose reducing the volume of the chamber (5) to about zero. In Figs. 2-4 and 10-11 of Chadwick, the diameter of the pillar (6) is larger than the diameter of the injection chamber (5), which means that the pillar (6) cannot move closer than is shown in Fig. 2 to the piston (4) to reduce the volume of the chamber to about zero. In Figs. 7-8 of Chadwick, the pillar comprises a fixed inner cylinder (6a) and a slidable outer cylinder (6b) in which the outer cylinder can be withdrawn. Either the fixed inner cylinder (6a) or the slidable outer cylinder (6b) cannot move to the piston (4) to reduce the volume of the chamber to about zero.

In contrast, the claimed invention recites that the volume of the chamber is reduced to about zero before feeding the material into the chamber. In light of the aforementioned arguments, Applicant submits that Chadwick fails to disclose each and every element of claim 1. Claim 2 depends from claim 1. Applicant therefore submits that claims 1-2 are in condition for allowance.

#### Claim Rejections Under 35 U.S.C. § 103

Claims 1-2 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Lester in view of Chadwick or GB 2,129,343 and vice versa. Applicant traverses this rejection in view of the remarks below.

Applicant submits that GB 2,129,343 fails to teach that the volume of the chamber is reduced to about zero before feeding the material into the chamber, as recited in claim 1. GB

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2,129,343 teaches in Fig. 1 that the material (3) is fed into a horizontal pressure chamber. The pressure chamber has a big empty volume before the material (3) is fed into the chamber. GB 2,129,343 does not teach that the volume of the pressure chamber is reduced to about zero before the material is fed into the chamber, as recited in claim 1. In GB 2,129,343, the blocking device (8) cannot move to the injection piston (4) to reduce the volume of the pressure chamber. In contrast, the claimed invention recites that the volume of the chamber is reduced to about zero before feeding the material into the chamber. In light of the aforementioned arguments, Applicant submits that Lester, Chadwick and GB 2,129,343 fail to teach or suggest all of the limitations of claim 1. Applicant therefore submits that claims 1-2 are in condition for allowance.

Response to Examiner's Replies to Earlier Arguments

With reference to the metering cavity 20 and mold cavity 16 of Lester, as noted October 27, 2003, Applicant again notes that the portions of the charge outside the mold cavity 16 do not form part of the casting, as they are considered sprue. Therefore, these portions, such as those remaining in the metering cavity 20 during freezing and thereby forming sprue, are not considered part of the casting. Plungers 15 and 17 do not contact the mold cavity 16 and are insufficient to teach or suggest a wall movable into the mold to partially determine the surface shape of the casting, as recited in claim 1.

Regarding the motivation to modify or combine the references, Applicant again asserts that the Examiner is improperly using the benefit of Applicant's specification. "The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." *Ex parte Chicago Rawhide Manufacturing Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984). Applicant submits that merely restating the benefits of Applicant's invention as motivation to modify or combine the references is improper. Applicant incorporates the arguments submitted October 27, 2003 herein by reference and notes that the

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references themselves do not provide the motivation to be modified or combined as asserted by the Office Action. As such, Applicant submits that the references are insufficient to sustain a rejection of the claims.

#### New Claims 4 - 9

Claim 4 is added to depend from claim 1 and recite that the volume of the chamber is reduced to an extent that contact with ambient air is precluded. Support for claim 4 can be found in Fig. 1 and corresponding description at page 3, lines 22-28. Support for claim 5 can be found at the paragraph bridging pages 4 and 5. No new matter is introduced. Claims 4 and 5 are patentable at least by way of their dependencies from claim 1.

Claims 6-9 are directed to methods for producing a casting out of a fusible or dispersible base material. Support for the new claims can be found throughout the specification and specifically at least in Figs. 1-4 and corresponding description at page 3, line 10 through page 5. Applicant submits that new claims 6-9 are in condition for allowance. No new matter is introduced.

#### CONCLUSION


In light of the aforementioned arguments, Applicant contends that each of the Examiners' rejections has been adequately addressed and the pending application is in condition for allowance.

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Should the Examiner feel that a telephone conference with Applicant's attorney would expedite prosecution of this application, the Examiner is urged to contact the Applicant's attorney at (617) 227-7400.

Respectfully submitted,  
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